Weather

4-4 The student will demonstrate an understanding of weather patterns and phenomena. (Earth Science)

4-4.1 Summarize the processes of the water cycle (including evaporation, condensation, precipitation, and runoff).
Taxonomy level: 2.4-B Understand Conceptual Knowledge

Previous/Future knowledge: Students have not been introduced to the concept of the water cycle although parts of it should be familiar. In 2nd grade (2-3.2), students recalled forms of precipitation as rain, snow, sleet, hail. In 3rd grade (3-4.2), students explained the processes of evaporation and condensation. Runoff is a new concept but can be related to the 3rd grade (3-3.8) material on weathering and erosion by water as it changes the land. Students will further develop this concept in 6th grade (6-4.2) including transpiration, an additional form of precipitation along with the conditions needed to form each type of precipitation, and surface-water along with ground-water flow. In 7th grade (7-4.5), students will further investigate runoff as surface water.

It is essential for students to know that water changes form and cycles between Earth's surface and the air and back again. The components of the *water cycle* process include:

Evaporation
- Liquid water on Earth becomes a gas, called *water vapor*, as part of the air through the process of evaporation.
- The process of evaporation results from the Sun's energy.

Condensation
- Condensation happens in the air as water vapor changes back to droplets of water. Clouds form as a result of condensation; *dew* also forms from condensation, but the water droplets condense directly onto a surface such as grass, a car, or glass.
- The process of condensation results from the cooling of air temperature.

Precipitation
- After condensation occurs allowing for the forming of clouds, any form of water that falls from the clouds is called precipitation (rain, snow, sleet, hail).
- Snow, sleet, and hail result from freezing temperatures in the air; rain forms when the air temperature is above freezing.

Runoff
- If precipitation falls on land surfaces, it attempts to return to the ocean or lakes as runoff.

It is not essential for students to know the process of transpiration from plants or the movement of water through the groundwater system.

Assessment Guidelines:
The objective of this indicator is to *summarize* the processes of the water cycle; therefore, the primary focus of assessment should be to generalize information about the parts of the water cycle. However, appropriate assessments should also require students to *identify* individual parts of the cycle; *illustrate* parts of the cycle using words, pictures, or diagrams; or *classify* by sequencing the cycle.